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AUTHOR	Anderson, Cindy L.; Borthwick, Arlene
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ABSTRACT

Research into the best method for developing preservice teachers who integrate technology is mixed in its conclusions. The International Society for Technology in Education (ISTE) study in 1999 indicated that integrating technology training into teacher education classes was the strongest predictor of success. However, subsequent research identified the self-contained class in educational technology as an essential tool for developing technology-integrating preservice teachers. This study compared survey results of two elementary education cohorts, both part of the Master of Arts in Teaching program that is part of the National-Louis University Preparing Tomorrow's Teachers to Use Technology grant, on their skills necessary to be successful technology-integrating teachers. One cohort received their introductory educational technology course as a class integrated into an introductory special education class while the other cohort received their introductory educational technology class as a separate, stand-alone class. Results indicated several areas where greater gain scores between pre-test and post-test were reported by the group receiving the stand-alone class. The student survey form and two syllabi are appended. (Contains 18 references and 16 tables.) (Author)

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Results of Separate and Integrated Technology Instruction in Preservice Training

Cindy L. Anderson

National-Louis University, Milwaukee, WI

clanderson@nl.edu

Arlene Borthwick

National-Louis University, Wheeling, IL

aborthwick@nl.edu

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Abstract

Research into the best method for developing preservice teachers who integrate technology is mixed in its conclusions. The ISTE study in 1999 indicated that integrating technology training into teacher education classes was the strongest predictor of success. However, subsequent research identified the self-contained class in educational technology as an essential tool for developing technology-integrating preservice teachers. This study compared survey results of two elementary education cohorts, both part of the Master of Arts in Teaching program that is part of the National-Louis University Preparing Tomorrow's Teachers to Use Technology grant, on their skills necessary to be successful technology-integrating teachers. One cohort received their introductory educational technology course as a class integrated into an introductory special education class while the other cohort received their introductory educational technology class as a separate, stand-alone class. Results indicated several areas where greater gain scores between pretest and posttest were reported by the group receiving the stand-alone class.

Results of Separate and Integrated Technology Instruction in Preservice Training

Today's preservice teachers are empowering tomorrow's leaders. The future that they will lead will be characterized by technology growth and change. To be prepared to meet this change, today's students must be trained in the use of technology and to access and evaluate information technology. The public, in the form of parents, employers, communities, and the nation (ISTE, 2000), is asking schools to prepare their children to meet these changes. To accomplish this, schools have increased their investment in computers for the last several years, leading to a recently reported ratio of 5.7 students per computer (Market Data Retrieval 1999).

With this demand for technology-literate public school students, comes the demand for technology-literate teachers. The National Council for Accreditation of Teacher Education (NCATE, 1997) estimated the need for 2 million new teachers to be trained in the decade from 1997 to 2007. All of these teachers need to be prepared to help develop technology-literate students. Indeed, the National Council for Accreditation of Teacher Education (NCATE) is demanding that beginning teachers be technology-literate (NCATE, 1997) in order for teacher education institutions to remain certified by NCATE (ISTE, 2000).

To support teacher education programs in their efforts to infuse technology into their curriculum, NCATE worked with the International Society for Technology in Education (ISTE) to develop a list of standards in technology-literacy for beginning teachers. Research continues to explore the best method for teacher education institutions to meet these requirements and develop accomplished technology-integrating preservice teachers.

Research done by the ISTE (1999) looked at successful methods of technology instruction to train preservice teachers. They surveyed teacher education institutions and determined that the most predictive measure for developing technology-integrating teachers was to expose them to technology-integrating teacher educators during their training, as opposed to the common method for training technology in teacher education, a separate course in technology in education.

Halpin's findings (1999) were similar. Her research compared the growth and transfer of knowledge and skills learned in two different preservice instructional settings: (1) a stand-alone computer literacy course and (2) an integrated mathematics/science methods course where technology was used in support of instructional tasks, but students were not given specific instruction on technology applications. Results showed that participants whose technology instruction was integrated in their methods course reported more frequent use of technology for both teacher productivity and student projects during both on-campus courses and their first year of actual classroom teaching,

Using this research as a basis for redefining programs, several programs were developed or changed to provide technology training integrated within other methods courses. Two such programs, the field-based model for undergraduate teacher education experiences at Arizona State University (ASU) (Brush, Igoe, Brinkerhoff, Glazewski, Ku, and Smith, 2001) and the National-Louis Preparing Tomorrow's Teachers for Technology program (Anderson & Borthwick, 2002) were developed based on this research. The ASU program developed a program that integrated technology training into methods course with field-experience

components, so that students would be provided with the opportunity to experience technology activities relevant to tasks that teachers perform in the classroom.

The National-Louis PT3 program developed a model in which the Introduction to Technology in Education course was integrated within coursework over the first year of the elementary education Master of Arts in Education program. During the first term of this new program, an effort was made to integrate technology instruction into the Introduction to Special Education methods course. Using this course, the instructors co-planned the technology integrated class. As topics within the special education course were introduced and could be related to an objective from the Master Course Outline of the Introduction to Technology in Education course, both these skills were introduced at the same time. The instructors tried to ensure that the technology skill taught operated as the tool for the topic in the special education class. If this was not possible, the relationship of the technology skill to the special education topic was emphasized as the technology skill was taught. A copy of their integrated syllabus is found in Appendix B. A pre-post survey of students enrolled in this methods course reflected many gains by students in knowledge, skills, and self-assessment of future applications of educational technology (Anderson & Borthwick, 2002).

Despite these significant gains, the survey results of this integrated program failed to show significant gains in several technology skills identified as required skills on the master course outline for Introduction to Technology in Education (Anderson & Borthwick, 2002). For example, the surveys failed to identify a significant gain in knowledge of spreadsheets and databases. Given these results,

instructors looked to the literature that supports providing technology training as a separate course as they considered restructuring the program.

In a follow-up study to the ISTE (1999) study, Bielefeldt (2001) further investigated the methods used by teacher education institutions who described themselves as most successful at producing technology-using students to train their preservice teachers. Results revealed that a self-contained class in technology in education was "essential" in addition to technology integration in other education coursework (p. 9). Likewise, using pre-post course surveys, Willis and de Montes (2000) found evidence of improved technology skills following a self-contained educational technology class, although preservice students reported minimal use of technology during their student teaching experience. Thus, Willis and de Montes recommended that SCDEs consider one skills-based course and one course focusing on technology integration in the curriculum.

Other literature related to the design of technology coursework for preservice students includes studies of preservice teachers' attitudes toward computer use. Willis and de Montes (2000) found that students entered a technology course with a positive attititude about their ability to succeed in learning to use technology and no pre-post course difference in attitude was found. However, Abbott and Faris (2000) identified increased positive attitudes toward computer use following a literacy course where instruction and assignments that required the use of technology were coupled with supportive faculty. In a study of technology integrated within science and mathematics methods courses, Thomas and Cooper (2000) used both computer anxiety and computer use pre-post course surveys; they found significant differences in preservice student perceptions of

computers as tools for enhancing efficiency and communication and in computer anxiety (increased levels of comfort and confidence).

The literature also provides valuable insight into methods used for integration of technology in existing coursework. Campbell and Warburton (1999) described their development of interdisciplinary assignments and projects for students enrolled simultaneously in introductory courses in both information technology and language arts. Abbott and Faris (2000) also describe, in some detail, methods of technology integration in a literacy course, while Thomas and Cooper (2000) discuss integration in science and mathematics methods courses, concluding with general recommendations suitable for all methods instructors.

Based upon the literature evidence, the PT3 program was revised so that the Introduction to Technology in Education course was offered as a separate course. The course was offered during the first term of the elementary education program and again during the same term as the Introduction to Special Education was offered. This study is a report comparing survey results of both cohorts, the MAT students who received their Introduction to Technology in Education course as an integrated course and the MAT students who received a separate course.

Specific research questions addressed in this study include:

1. Will MAT teachers involved in a self-contained Introduction to Technology in Education class improve their knowledge and ability to operate microcomputers and their peripherals within the classroom more than MAT students who took the technology class as a class that was integrated into an Introduction to Special Education class?

2. Will MAT teachers involved in a self-contained Introduction to Technology in Education class improve their ability to evaluate software and to use technology effectively for instruction within the classroom more than MAT students who took the technology class as a class that was integrated into an Introduction to Special Education class?

3. Will MAT teachers involved in a self-contained Introduction to Technology in Education class improve their knowledge and ability to use technology as a teacher tool their more than MAT students who took the technology class as a class that was integrated into an Introduction to Special Education class?

4. Will MAT teachers involved in a self-contained Introduction to Technology in Education class feel better able to develop a technology plan than MAT students who took the technology class as a class that was integrated into an Introduction to Special Education class?

5. Will MAT teachers involved in a self-contained Introduction to Technology in Education class disseminate their knowledge and ability to operate microcomputers and their peripherals more than MAT students who took the technology class as a class that was integrated into an Introduction to Special Education class?

Each of these research questions was addressed through several questions on the survey instrument. The survey instrument is found in Appendix A. Researchers asked the students to rate their expertise on a 5-point scale. Students were asked to rate their expertise according to the following descriptors: no knowledge in this area, awareness but need to know more to utilize, limited skills in this area and desire more, basic knowledge to use the area, and competent in the

area. Researchers expected a greater gain score from pretest to posttest in the MAT group that took the self-contained introduction to educational technology class than the MAT group that took the introductory class as a class integrated within their introduction to special education class. A copy of the syllabi from each class is found in Appendices B and C.

The Subjects

The subjects of this study were members of two different elementary education cohorts of the Master of Arts in Teaching program in Milwaukee, Wisconsin. The Master of Arts in Teaching program is a part of the Preparing Tomorrow's Teachers for Technology (PT3) grant awarded to National-Louis University. The program is in its second year of the three-year cycle. The program is designed to provide an alternative certification program for adults who already have their Bachelor of Arts degrees and wish to join the teaching force. The program was further designed to provide a stronger technology emphasis than the traditional MAT program offered by National-Louis. To help accomplish this goal, these students were required to complete the Technology in Education (TIE) class at the 500 level, Introduction to Technology in Education. This course was offered to the first cohort, IC, in their first term of instruction as a class that was integrated within their introductory methods course in educating students with disabilities, SPE 500 or Introduction to Special Education. This cohort will be identified for this paper as IC. The second cohort, SAC, was offered Introduction to Technology in Education as a stand-alone course. They will be identified in this paper as SAC.

The first cohort group in this study included twelve members while the second cohort contained 15 members. Each cohort met one night per week when

classes were offered for six consecutive hours, from 4:30 in the afternoon until 10:30 at night, to accommodate the working adult. Each cohort member was given a Gateway laptop computer as a part of the PT3 program. In addition, their instruction occurred within the Macintosh computer lab at Manitoba Elementary School, an elementary school that is part of the Milwaukee Public School System, a partner in the PT3 grant.

Methodology

Each cohort involved in this study was provided instruction in educational technology during the first semester of their Master of Arts in Teaching program. The first cohort, IC, received their TIE 500 class as a class that was integrated within SPE 500, Introduction to Special Education. The second cohort, SAC, received their TIE 500 class as a separate class during the same term that they received their SPE 500 class. The integrated class was developed jointly by the instructors of the two courses. When the SPE 500 topic included something related to a skill from the objectives of the TIE 500 class, both topics were taught at the same time. A copy of the joint syllabus is found in Appendix C. The other cohort received two separate classes, beginning the evening with SPE 500 and ending the evening with TIE 500, each following the official syllabus of the respective course.

Pretest and posttest survey results were collected from each of the cohort students during the first and last nights of class to measure the effectiveness of this method. The survey instrument used was adapted from an instrument used by Blackhurst (1988) to measure technology skills in beginning teachers and subsequently modified by Anderson and Anderson (2001) and Anderson and Petch-Hogan (2001) for their research. Results of this survey for IC were reported

by Anderson and Borthwick (2002) and generally reflected significant gains in most areas of the survey. A copy of the survey instrument used is found in Appendix A.

The pretest was administered at the start of the ten-week term, while the posttest was administered following the completion of the experience. Analysis was done with SPSS 10 for Windows (SPSS, 1999) and use of a Microsoft (2001) Excel spreadsheet. Excel was used to list individual survey score results and calculate gain scores for each student on each item of the survey. Using the results or the gain scores of each MAT student, an independent samples t-test was run for each survey item using gain scores as the dependent variable. Significance level was set at .05. The first cohort (IC) had 12 students while the second cohort (SAC) had 15 students.

The Results

To address the first question (Will MAT teachers involved in a self-contained Introduction to Technology in Education class improve their knowledge and ability to operate microcomputers and their peripherals within the classroom more than MAT students who took the technology class as a class that was integrated into an introduction to special education class?), the survey instrument asked students to rate their ability to successfully operate a computer and acquire knowledge about technology. These computer skills include such skills as knowing best operating conditions, simple computer troubleshooting, and safety features of a computer, operating a variety of peripheral devices, and being able to perform several activities needed to successfully use the operating systems of a Windows and Macintosh computer. Knowledge skills were assessed with questions related to knowing about and maintaining knowledge about technology applications. Results

are reported in Tables 1, 3, and 5. Statistics for these survey results are found in Tables 2, 4, and 6 respectively.

Table 1

Knowledge of operation of microcomputers and peripherals

Skill	t	df	Mean Diff.	Std. Err Dif	Sig.	Sig
Operate a computer	-1.24	25	-2.5	.2	.113	
Operate a projection device	-1.45	25	-.58	.40	.08	
Hook up external devices	-1.45	25	-.58	.40	.079	
Install and set up software	-1.94	25	-.72	.37	.032	*
Explain safety features	-1.30	25	-.62	.47	.102	
Explain best operating conditions	-.682	25	-.35	.51	.251	
Use simple techniques for trouble-shooting	-1.47	25	-.68	.46	.076	
Perform routine maintenance	-1.13	25	-.47	.41	.135	
Operate CD-ROMs	-1.30	25	-.57	.44	.104	
Operate and maintain printers	-1.82	25	-.90	.49	.04	*
Operate and maintain scanners	-2.41	25	-.80	.33	.012	*
Operate and maintain digital cameras	-1.70	25	-.72	.42	.05	*

Note. An * in the s column denotes a significant value.

*p < .05

Table 2

Knowledge of operation of microcomputers and peripherals

	Number		Mean		Std. Dev.		St. Err. Mean	
Skill	IC	SAC	IC	SAC	IC	SAC	IC	SAC
Operate a computer	12	15	-.02	.17	.51	.52	.15	.14
Operate a projection device	12	15	.42	1.00	1.00	1.07	.29	.28
Hook up external devices	12	15	.42	1.00	1.00	1.07	.29	.28
Install and set up software	12	15	.42	1.13	.79	1.06	.23	.27
Explain safety features	12	15	.58	1.20	1.38	1.08	.40	.28
Explain best operating conditions	12	15	.92	1.27	1.38	1.28	.40	.33
Use simple techniques for trouble-shooting	12	15	.58	1.27	1.08	1.28	.31	.33
Perform routine maintenance	12	15	.67	1.13	1.15	.99	.33	.26
Operate CD-ROMs	12	15	.50	1.07	.52	1.44	.15	.37
Operate and maintain printers								
Operate and maintain scanners	12	15	.17	1.07	1.11	1.39	.32	.36
Operate and maintain digital cameras	12	15	.00	.80	.60	1.01	.17	.26

Table 3

Use of computer operating systems

Skill	t	df	Mean Diff.	Std. Err Dif	Sig.	Sig
Initialize disks	-.636	25	-.37	.58	.266	

Operate/navigate Mac system	-.286	25	-.15	.52	.389	
Operate/navigate Win system	-1.23	25	-.83	.68	.116	
Begin software in Macintosh	-2.54	20.7	-1.03	.41	.01	*
Begin software in Windows	-1.19	25	-.58	.49	.123	
Delete program in Macintosh	-1.43	25	-.77	.54	.083	
Change settings in Macintosh	-.925	25	-.38	.41	.182	
Find file in Macintosh	-1.20	25	-.50	.42	.121	
Make alias in Macintosh	-1.11	25	-.63	.57	.139	
Configure peripherals in Macintosh	-.974	25	-.47	.48	.170	
Delete program in Windows	-1.04	25	-.55	.53	.154	
Change settings in Windows	-1.22	25	-.57	.46	.117	
Find file in Windows	-1.30	25	-.62	.47	.102	
Make shortcut in Windows	-1.31	25	-.62	.47	.102	
Configure peripherals in Windows	-1.31	25	-.62	.47	.102	

Note. An * in the s column denotes a significant value.

*p < .05

Table 4

Use of computer operating systems

	Number		Mean		Std. Dev.		St. Err. Mean	
Skill	IC	SAC	IC	SAC	IC	SAC	IC	SAC
Initialize disks	12	15	1.17	1.53	1.53	1.46	.44	.38
Operate/navigate Mac system	12	15	1.58	1.73	1.16	1.49	.34	.38

Operate/navigate Win system	12	15	.83	1.67	1.59	1.88	.46	.48
Begin software in Macintosh	12	15	.33	1.37	.65	1.39	.19	.36
Begin software in Windows	12	15	1.08	1.67	1.38	1.18	.40	.30
Delete program in Macintosh	12	15	.50	1.27	1.57	1.22	.45	.32
Change settings in Macintosh	12	15	1.08	1.47	1.08	1.06	.31	.27
Find file in Macintosh	12	15	.83	1.33	1.11	1.05	.32	.27
Make alias in Macintosh	12	15	1.17	1.80	1.80	1.15	.52	.30
Configure peripherals in Macintosh	12	15	1.50	1.97	1.31	1.17	.38	.30
Delete program in Windows	12	15	1.25	1.80	1.29	1.42	.37	.37
Change settings in Windows	12	15	1.50	2.07	1.31	1.10	.38	.28
Find file in Windows	12	15	1.42	2.03	1.24	1.20	.36	.31
Make shortcut in Windows	12	15	1.42	2.03	1.24	1.20	.36	.31
Configure peripherals in Windows	12	15	1.42	2.03	1.24	1.20	.36	.31

Table 5

Acquire knowledge of the use of computers and related technology

Skill	t	df	Mean Diff.	Std. Err Dif	Sig.	Sig
Define terms and concepts related to technology applications	-.299	25	-.01	.33	.384	
Identify major issues associated with the use of computers	-2.78	25	-1.00	.36	.005	*
Identify ways that	-.186	25	-.02	.45	.427	

computers can be infused into the curriculum.					
Take steps to keep knowledge and skills in technology up to date.	-.213	25	.02	.39	.417
Identify sources of information about technology.	-3.91	25	-1.88	.48	.001

Note. An * in the s column denotes a significant value.

*p < .05

Table 6

Acquire knowledge of the use of computers and related technology

	Number		Mean		Std. Dev.		St. Err. Mean	
Skill	IC	SAC	IC	SAC	IC	SAC	IC	SAC
Define terms and concepts related to technology applications	12	15	.83	.93	.72	.96	.21	.25
Identify major issues associated with the use of computers	12	15	.17	1.17	.94	.92	.27	.24
Identify ways that computers can be infused into the curriculum.	12	15	1.42	1.50	1.08	1.21	.31	.31
Take steps to keep knowledge and skills in technology up to date.	12	15	1.25	1.33	1.14	.90	.33	.23
Identify sources of information about technology.	12	15	-.42	1.47	1.38	1.13	.40	.29

Table 1 results indicate that the self-contained cohort, SAC, identified a greater improvement in their ability to install software and to operate and maintain printers, scanners, and digital cameras. In Table 3, SAC reported a greater improvement in their ability to start using software on the Macintosh computer. Table 5 findings identify a greater improvement in SAC cohort's knowledge of major issues associated with the use of technology.

To address the second research question (Will MAT teachers involved in a self-contained Introduction to Technology in Education class improve their ability to evaluate software and use of technology effectively for instruction within the classroom more than MAT students who took the technology class as a class that was integrated into an introduction to special education class?) students were asked to rate their ability identify the purpose of a software program, evaluate the content to match the learner, evaluate the documentation, and use the teacher options. To address the second part of the question, use of the technology for instruction, students were asked to Results are found in Tables 7 and 9.

Table 7

Evaluation of software

Skill	t	df	Mean Diff.	Std. Err Dif	Sig.	Sig
Identify the purpose of the software program.	-2.56	25	-.90	.35	.009	*
Determine the characteristics of learners appropriate for the program.	-1.65	25	-.72	.43	.056	

Identify characteristics of software that meets instructional needs.	-1.23	25	-.67	.54	.115	
Evaluation of the content.	-3.00	25	-1.27	.42	.003	*
Match level of difficulty with learner.	-2.67	25	-1.23	.47	.007	*
Evaluate documentation.	-1.89	25	-.97	.51	.035	*
Determine teacher options.	-1.49	25	-.75	.50	.075	
Set up options for use	-4.11	25	-1.93	.47	.000	*

Note. An * in the s column denotes a significant value.

*p < .05

Table 8

Evaluation of software

	Number		Mean		Std. Dev.		St. Err. Mean	
Skill	IC	SAC	IC	SAC	IC	SAC	IC	SAC
Identify the purpose of the software program.	12	15	.50	1.40	.67	1.06	.19	.27
Determine the characteristics of learners appropriate for the program.	12	15	1.08	1.80	1.08	1.15	.31	.30
Identify characteristics of software that meets instructional needs.	12	15	1.33	2.00	1.23	1.51	.36	.39
Evaluation of the content.	12	15	.67	1.93	.78	1.28	.22	.33
Match level of difficulty with learner.	12	15	.83	2.07	1.11	1.28	.32	.33
Evaluate documentation.	12	15	1.17	2.13	1.27	1.36	.37	.35

Determine teacher options.	12	15	1.25	2.00	1.14	1.41	.33	.37
Set up options for use	12	15	.00	1.93	1.41	1.03	.41	.27

Table 9

Use of technology to facilitate instruction

Skill	t	df	Mean Diff.	Std. Err Dif	Sig.	Sig
Use technology for effective instructional practice.	-1.30	25	-.62	.47	.102	
Set up classroom for effective instructional practice.	-1.22	25	-.57	.46	.117	
Use tutorial programs. effectively.	-1.04	25	-.55	.53	.154	
Use drill and practice programs effectively.	-.974	25	-.47	.48	.170	
Use problem solving programs effectively.	-1.11	25	-.63	.57	.139	
Use tool software for students.	-1.20	25	-.50	.42	.121	
Use tool software for teachers.	-.925	25	-.38	.41	.182	
Use assistive technology appropriately	-1.43	25	-.77	.55	.083	
Evaluate the effectiveness of technology applications	-1.19	25	-.58	.49	.123	
Use the Internet for research	-2.54	20.71	-1.03	.44	.013	*
Use Internet online learning activities	-1.23	25	-.83	.60	.116	
Have students use multimedia for creating projects.	2.286	25	-.15	.52	.389	
Have students use Web pages to	-.636	25	-.37	.58	.265	

create projects.

Note. An * in the s column denotes a significant value.

*p < .05

Table 10

Use of technology to facilitate instruction

	Number		Mean		Std. Dev.		St. Err. Mean	
Skill	IC	SAC	IC	SAC	IC	SAC	IC	SAC
Use technology for effective instructional practice.	12	15	1.42	2.03	1.24	1.20	.36	.31
Set up classroom for effective instructional practice.	12	15	1.50	2.07	1.31	1.10	.38	.28
Use tutorial programs effectively.	12	15	1.25	1.80	1.29	1.42	.37	.37
Use drill and practice programs effectively.	12	15	1.50	1.97	1.31	1.17	.38	.30
Use problem solving programs effectively.	12	15	1.17	1.80	1.80	1.15	.52	.30
Use tool software for students.	12	15	.83	1.33	1.11	1.05	.32	.27
Use tool software for teachers.	12	15	1.08	1.47	1.08	1.06	.31	.27
Use assistive technology appropriately	12	15	.50	1.27	1.57	1.22	.45	.32
Evaluate the effectiveness of technology applications	12	15	1.08	1.67	1.38	1.18	.40	.30
Use the Internet for research	12	15	.33	1.37	.65	1.39	.19	.36
Use Internet online learning activities	12	15	.83	1.67	1.59	1.88	.46	.48
Have students use multimedia for creating projects.	12	15	1.58	1.73	1.16	1.49	.34	.38

Have students use Web pages to create projects.	12	15	1.17	1.53	1.53	1.46	.44	.38

Cohort SAC reported a greater increase in their ability to identify the purpose of a software program, their ability to evaluate content and documentation, their ability to match the level of difficulty with the learner and use the options of the program. Cohort SAC reported a greater increase in their ability to use the Internet for research to facilitate instruction than cohort IC.

To address the third research question (Will MAT teachers involved in a self-contained Introduction to Technology in Education class improve their knowledge and ability to use technology as a teacher tool their more than MAT students who took the technology class as a class that was integrated into an introduction to special education class?), students were asked to rate their ability to use word processors, databases, spreadsheets, utility programs, email, listservs, bulletin boards, IEP generators, portfolio software, and manage files. Results can be found in Table 11 with statistics in Table 12.

Table 11

Use of technology as a teacher tool

Skill	t	df	Mean Diff.	Std. Err Dif	Sig.	Sig
Use a word processor to develop materials.	-.883	25	-.55	.62	.192	
Use utility programs	-1.954	25	-.70	.36	.031	*
Use a database. effectively.	-4.23	25	-.1.85	.44	.000	*
Use a spreadsheet	-2.32	25	-.1.27	.55	.015	*
Use email programs effectively.	-2.63	25	-.1.05	.40	.008	*

Use the Internet for lesson plans.	-.644	25	-.33	.52	.263	
Use the Internet for researching information.	-7.01	25	-3.53	.50	.000	*
Use listservs	-.934	25	-.45	.48	.18	
Use bulletin boards	-.599	25	-.32	.53	.277	
Use IEP generators	-1.08	25	-.48	.45	.115	
Use word processor for IEPs, reports	-.719	25	-.38	.53	.240	
Use portfolio software	-2.40	25	-1.13	.47	.012	*
Conduct regular back-ups of data.	-4.36	25	-1.70	.39	.000	*
Transfer files between different computers/programs.	-4.76	25	-1.92	.40	.000	*

Note. An * in the s column denotes a significant value.

*p < .05

Table 12

Use of technology as a teacher tool

	Number		Mean		Std. Dev.		St. Err. Mean	
Skill	IC	SAC	IC	SAC	IC	SAC	IC	SAC
Use a word processor to develop materials.	12	15	.92	1.47	1.56	1.64	.45	.42
Use utility programs	12	15	.17	.87	.72	1.06	.21	.27
Use a database. effectively.	12	15	.02	1.93	.90	1.28	.26	.33
Use a spreadsheet	12	15	.67	1.93	1.67	1.16	.48	.30
Use email programs effectively.	12	15	.02	1.13	.67	1.25	.19	.32
Use the Internet for lesson plans.	12	15	1.67	2.00	1.30	1.36	.38	.35
Use the Internet for researching information.	12	15	-1.67	1.87	1.30	1.30	.38	.34

Use listservs	12	15	1.08	1.53	.90	1.46	.26	.38
Use bulletin boards	12	15	1.08	1.40	.90	1.64	.26	.42
Use IEP generators	12	15	1.25	1.73	1.06	1.22	.30	.32
Use word processor for IEPs, reports	12	15	1.42	1.80	1.00	1.61	.29	.42
Use portfolio software	12	15	.67	1.80	1.15	1.26	.33	.33
Conduct regular back-ups of data.	12	15	-.17	1.53	.72	1.19	.21	.31
Transfer files between different computers/programs.	12	15	.02	2.00	1.31	.76	.38	.20

Students from SAC reported they became more skilled using utility programs such as spell checkers, thesauruses, wizards, and mail merging. They reported a greater improvement than cohort 19 in their ability to use databases, spreadsheets, email, and the Internet for researching information. Cohort SAC also reported a greater increase in their ability to use portfolio software, do regular backups of data, and their ability to transfer files.

Responses to the fourth research question (Will MAT teachers involved in a self-contained Introduction to Technology in Education class feel better able to develop a technology plan than MAT students who took the technology class as a class that was integrated into an Introduction to Special Education class?) were addressed by asking the cohorts to rate their ability to identify goals for using technology in the classroom, identifying parts of the curriculum for technology, setting up the classroom for technology, ensuring equitable access and creating guidelines for its use. They were asked their ability to plan purchase of the

technology by asking their ability to set a budget, find funding sources, and writing a grant. The results are recorded in Table 13 with the statistics in Table 14.

Table 13

Developing a technology plan

Skill	t	df	Mean Diff.	Std. Err Dif	Sig.	Sig
Identify goals for using technology in education.	-1.25	25	-.47	.37	.111	
Identify parts of the curriculum that are appropriate for technology.	-.709	25	-.25	.35	.243	
Plan appropriate classroom changes for technology.	-1.85	25	-.60	.32	.039	*
Ensure equitable access to the computer.	-.344	25	-.13	.39	.347	
Create guidelines for technology use.	-1.26	25	-.52	.41	.109	*
Develop a budget for technology.	-2.31	25	-1.07	.46	.015	*
Determine possible funding sources for technology needs.	-2.69	25	-1.32	.49	.006	*
Write grants for technology	-.843	25	-.47	.55	.204	

Note. An * in the s column denotes a significant value

*p < .05

Table 14

Developing a technology plan

	Number		Mean		Std. Dev.		St. Err. Mean	
Skill	IC	SAC	IC	SAC	IC	SAC	IC	SAC

Identify goals for using technology in education.	12	15	1.33	1.80	.89	1.01	.26	.26
Identify parts of the curriculum that are appropriate for technology.	12	15	1.58	1.83	1.00	.84	.29	.22
Plan appropriate classroom changes for technology.	12	15	1.33	1.93	.89	.80	.26	.21
Ensure equitable access to the computer.	12	15	1.67	1.80	.89	1.08	.26	.28
Create guidelines for technology use.	12	15	1.42	1.93	1.08	1.03	.31	.27
Develop a budget for technology.	12	15	.67	1.73	.98	1.33	.28	.34
Determine possible funding sources for technology needs.	12	15	.42	1.73	1.16	1.33	.34	.34
Write grants for technology	12	15	.33	.80	1.56	1.32	.45	.34

*p < .05

Cohort SAC students reported a greater increase in their ability plan appropriate changes to the classroom to accommodate technology than cohort IC. They further reported a greater increase in their ability to create guidelines for technology use, their ability to develop a budget, and their skill at determining possible funding for technology.

Responses to the fifth research question (Will MAT teachers involved in a self-contained Introduction to Technology in Education class disseminate their knowledge and ability to operate microcomputers and their peripherals more than MAT students who took the technology class as a class that was integrated into an

Introduction to Special Education class?) were addressed by asking students if they maintain a file of information on technology, if they provide consultation to colleagues and parents, if they make presentations, and if they prepare written reports on technology. Responses are recorded in Table 15 with statistics recorded in table 16.

Table 15

Dissemination of technology information

Skill	t	df	Mean Diff.	Std. Err Dif	Sig.	Sig
Maintain a file of information on technology.	-2.17	25	-1.02	.47	.02	*
Provide consultation to colleagues on technology.	-1.87	25	--83	.44	.037	*
Provide consultation to parents on technology.	-1.31	25	-.62	.47	.105	
Make presentations on technology.	-2.68	25	-1.35	.50	.007	*
Prepare written reports/articles on technology.	-.789	25	-.50	.63	.219	

Note. An * in the s column denotes a significant value.

*p < .05

Table 16

Dissemination of technology information

	Number		Mean		Std. Dev.		St. Err. Mean	
Skill	IC	SAC	IC	SAC	IC	SAC	IC	SAC
Maintain a file of information	12	15	.58	1.60	1.31	1.12	.38	.29

on technology.								
Provide consultation to colleagues on technology.	12	15	.83	1.67	1.11	1.18	.32	.30
Provide consultation to parents on technology.	12	15	1.08	1.70	1.31	1.13	.38	.29
Make presentations on technology.	12	15	.42	1.77	1.38	1.24	.40	.32
Prepare written reports/articles on technology.	12	15	.83	1.33	1.11	1.95	.32	.50

According to the survey results, students in cohort SAC reported a greater increase in their ability to maintain a file of information on technology, their ability to provide consultation to colleagues, and their ability to make presentations about technology than students in cohort 19.

To summarize, survey results comparing the pretest to posttest responses of cohort IC to those of cohort SAC, both elementary education MAT groups, indicated several areas that SAC students, those who took the separate Introduction to Technology in Education course, reported a greater improvement from pretest to posttest. Cohort SAC reported a greater improvement than IC in their ability to set up and install software and operate printers, scanners and digital cameras. Cohort SAC reported a greater increase in their ability to begin a software program on a Macintosh computer and to identify major issues associated with the use of technology. Identifying the purpose of a software program, evaluating the content, matching the level of difficulty with the learner, evaluating the documentation, setting up options for using software, and using the Internet for research were reported as

greater areas of improvement by SAC than IC. Cohort SAC also indicated a greater improvement in their ability to use utility programs, use databases, use spreadsheets, use email, use the Internet to aid teaching, use portfolio software, make regular backups, and transfer files between different programs. Other areas of the surveys filled out by cohorts IC and SAC failed to show significant difference in the gain between pretest and posttest.

Discussion

Beginning teachers are required to master skills identified by the International Society for Technology in Education and recognized by the National Council for the Accreditation of Teacher Education (1997). To meet these technology standards, two elementary education cohorts were offered different methods of instruction. One, cohort IC, was taught the skills to meet these standards as a class, Introduction to Technology in Education, integrated within the Introduction to Special Education class (Appendix B) while the other cohort, WC 20, was offered a separate class (Appendix C). To determine which group reported a greater change in technology expertise, a survey instrument was administered, both as a pretest at the beginning of the term that they received the class Introduction to Technology in Education and at the conclusion of this term.

The first study question asked if cohort members involved in a self-contained Introduction to Technology in Education class would indicate that they improved their knowledge and ability to operate microcomputers and peripherals within the classroom more than the cohort that received their class integrated into the Introduction to Special Education class. This study suggested that this group improved their scores significantly in several areas: installing and setting up

software; operating and maintaining printers, scanners and digital cameras; and beginning software programs on the Macintosh computer. They failed to show significant gain scores in their ability to operate a computer; operate a projection device; hook up external devices; explain safety features of the computer and peripherals; explain best operating conditions for computers; use simple trouble-shooting techniques; perform routine maintenance; initialize disks; operate and navigate the Macintosh and Windows systems; begin software in Windows; delete programs, change settings, find files, make alias, and configure peripherals on the Macintosh; delete programs, change settings, find files, make shortcuts, and configuring peripherals in Windows.

Survey evidence would seem to indicate SAC demonstrated more areas of improvement during the term of instruction. An explanation for this might be found in the syllabi for the two courses. The syllabi for cohort WC19, the group with the integrated technology class, are found in Appendix B, both the integrated syllabi and the syllabi for the course itself. The syllabus for cohort SAC is found in Appendix C. Using the syllabi from the courses, the cohort with self-contained course was provided with a more in-depth introduction to the interface of the Windows computer (Night 1). The integrated nature of the technology class offered to the other cohort, IC, did not provide the time to teach such an in-depth introduction to the operation of their computers.

The syllabi also reveal that more time was available to SAC to explore technology in general. During night two, the subject, according to the syllabus for cohort SAC was best practice in methods of integrating technology into the curriculum. The syllabi for IC fails to indicate that this type of broad introduction to

the use of computers and technology in the classroom was provided. Topics were correlated with the Introduction to Special Education course, limiting the opportunity to provide IC with a complete introduction to general computer use on the Macintosh computers in the Manitoba lab or to provide sufficient instruction on the installation of software on their laptops. This might provide an explanation for the significance in gain scores for SAC on these survey items.

Instruction in peripheral devices such as scanners, printers, and digital cameras were also restricted for IC. While the syllabus for this group reflects multimedia and Web page design, along with portfolio instruction, the syllabi for SAC provides a more detailed project requirement that uses these skills, the Web page portfolio requirement. As part of this project, students in SAC were required to develop Web-based page portfolio pages that required the use of these skills in their project. The assignment was to provide some artifacts using scanned documents, an individual's digital image on the cover of the portfolio, and a printed version of the results to be turned into the instructor. These skills required the SAC student to perform them; the same was not asked of the IC student.

The second research question addressed the MAT students' ability to evaluate software and to use technology effectively for instruction. To measure this area, the survey asked the students to identify the purpose of a software program, determine characteristics of learners appropriate for software, identify characteristics of software that meet instructional needs, evaluate the content, match the level of difficulty with the learner, evaluate the documentation and teacher options, and be able to set up options for using the software. To measure students' ability to use technology for effectively for instruction, the survey asked students to rate their

ability to use technology for effective instructional practice; set up the classroom for effective instructional practice; use tutorial, drill and practice, and problem solving programs; use tool software for both teachers and students, use assistive technology, evaluate the effectiveness of technology, use the Internet for research, use the Internet for online learning activities, use multimedia, and Web pages to create projects. Results were significant for many areas related to the evaluation of software indicating that SAC felt better able to do this than IC as a result of instruction. An explanation for this might again be found in the syllabi for the course. Because the time allowed for the course was greater, more software packages were required to be evaluated by the cohort, SAC, helping them to feel better able to do this skill. At the same time, both cohorts were exposed to the use of a variety of technology that could be used to facilitate instruction: language arts software, multimedia, assistive technology, Web pages, and the Internet. This might explain the nonsignificant differences in gain scores for these areas identified . Each cohort was taught to the types of software, tutorials, drill and practice packages and problem-solving packages, when they each explored technology-integrated lessons on the Web, explaining the nonsignificant results of these areas.

At the same time, survey results indicate a significant difference in gain scores between the two cohorts in use of the Internet for research. This might again be explained by the contents of the syllabi. The Internet use by cohort 19 had a focused intent, evaluating Web sites and finding lessons on the Web. For cohort 22, the Internet was used in a broader sense: to explore online activities, facilitate instruction and learn WebCT. This might have made this group better prepared to use the Internet for research.

Students' responses to the third research question (Will MAT teachers involved in a self-contained Introduction to Technology in Education class improve their knowledge and ability to use technology as a teacher tool more than MAT students who took the technology class as a class that was integrated class into the Introduction to Special Education class?), reflected many areas where SAC felt that they had greater improvement than their ability to use software as a teacher tool than IC. Areas of significance include ability to use utility programs like spell checkers and thesauruses, ability to use a database, ability to use a spreadsheet, ability to use email, ability to use portfolio software, conduct regular backups and transfer files between computers.

The instruction in these areas that was received by cohort IC was much more focused than that of SAC. Looking at the two syllabi, the word processing instruction received by IC was related to finding lessons on the Web and generating other lessons of their own using a word processor. Thus, this group did not receive extensive instruction in using word processors, as the other group did. SAC received specific instruction in Microsoft Word and then used it as Web authoring software for their portfolios. Comparing the two syllabi for telecommunications activities, both SAC and IC received direct instruction in using the Web to find lesson plans, yet neither received direct instruction in the use of listservs, bulletin boards, or IEP generators. Further comparison of the respective syllabi reveals a portfolio project requirement for cohort SAC that IC did not have, explaining this significant gain score difference, SAC had more time to explore the operation of the computers including making backups and transferring files.

Results of the fourth research question (Will MAT teachers involved in a self-contained Introduction to Technology in Education class feel better able to develop a technology plan than MAT students who took the technology class as a class that was integrated into an introduction to special education class?) reflected several areas where SAC felt better prepared to develop a technology plan. This area is measured by students' s ability to identify goals for using technology, identify parts of the curriculum that are appropriate for technology, plan appropriate classroom changes for accommodating technology in the class, ensure equitable access to the computer, create guidelines for technology use, develop a budget for technology, determine possible funding sources, and write grants for technology. Students in SAC reported a greater gain in classroom changes, creating technology guidelines, developing budgets, and determining possible funding sources for technology needs.

An explanation of the results might be found in the syllabi of the two courses again. Cohort SAC had more opportunities to receive instruction in the skills necessary to develop a technology plan. They discussed best practices for the integration of technology into the classroom, so that they felt better able to make room changes for technology and create guidelines for using technology. SAC was asked to evaluate more software packages than IC. On the software evaluation for that SAC used, students were asked to find the price of the software, making SAC better aware of the prices of software. This is information that would be needed when developing a budget. While looking this information up for their larger assignment, SAC could very well have encountered more sources for funding technology purchases, providing an explanation for this significant area.

At the same time, nonsignificant areas might be explained by the syllabi also, While SAC had more software evaluations to do, the form to evaluate the software required the students to identify instructional goals that the software can be used for and identifying those curriculum areas where it can be best integrated and write a lesson description using the software. This might make the nonsignificant differences in gain scores, since both groups were required to do this. Finally, since neither group received specific instruction in writing grants for funding technology, neither group reported great gain in this area explaining the nonsignificant gain. Indeed, the mean gain scores (Table 14) were only .33 for IC and .80 for SAC.

Responses to the fifth research question (Will MAT teachers involved in a self-contained Introduction to Technology in Education class disseminate their knowledge and ability to operate microcomputers and their peripherals more than MAT students who took the class as a class that was integrated into an introduction to special education class) reported several areas of significance. This area was measured by asking students to rate themselves on maintaining a file of technology information, providing consultation to colleagues, providing consultation to parents, making presentations on technology, and preparing reports or articles on technology. Of these areas, SAC reported greater gain scores in maintaining a file of technology information, providing consultation to colleagues, and making presentations. An explanation for these results might be found by looking at several things. First of all, comparing the two syllabi of the groups indicates a greater emphasis on beginning an electronic portfolio for SAC, a file that provides information on technology. In addition, with more software packages to evaluate, SAC would have a larger file of information technology.

An explanation for the significant increase in providing consultation to colleagues for SAC might be that IC student roster included the technology coordinator for Manitoba Elementary School. She quickly came to the aid of students experiencing trouble in this cohort, so that it was unnecessary for others to provide assistance. Cohort SAC did not have this person, so that students had to help their colleagues having trouble significantly more than IC.

The syllabi provide a possible explanation for the significant gain score in making presentations on technology. Since SAC had more time available and not a pointed focus on their technology instruction, they were asked to demonstrate their software packages and portfolios to the class. This might be the explanation for their greater gain score in this area.

At the same time, neither group was required to provide technology consultation to parents nor to prepare written articles on technology. Mean differences for both groups in these two areas were only .62 and .50 respectively.

To summarize the findings of this research, surveys for two groups of cohort students, IC and SAC, were compared for gain scores in this study. The first cohort, IC, took their Introduction to Technology in Education course as a course that was integrated within the Introduction to Special Education. The latter cohort, SAC, took their two courses as separate courses. A variety of technology integration areas were measured using a survey instrument on which students rated their ability on a 5-point scale. Areas that were rated included students' ability to improve their technology knowledge and skills, their ability to evaluate software and use technology in the effectively with instruction, their ability to use technology as a teacher tool, their ability to develop a technology plan and their ability to disseminate

this technology knowledge. On several skills, the cohort that took the class in technology separately, SAC, reported a statistically significantly higher gain score than the cohort who took the technology class as an integrated class, IC. For most areas, these results could explained because the technology skills in the integrated technology class were correlated to the skills taught in the special education class. The separate class allowed more time for instruction and allowed more extensive instruction in technology integration.

Implications for Future Research

While noting the limitations caused by small sample size and the possibility that survey results reflect a student's desire to please his or her instructor, this research study offers several areas for future study. Future research might follow these cohort members into their classrooms and measure which students become the most successful at integrating technology. Future research might look at these technology-integrating skills at the end of the cohorts' training programs and see if the focus of technology throughout the Preparing Teacher for Tomorrow's Technology program causes the significant differences in gain scores to disappear. These cohorts in PT3 might be compared in these skills areas with the traditional MAT program at National-Louis University who do not receive a TIE 500 class to determine if their program provides a greater ability to integrate technology. Finally, in our comparison of integrated vs. stand-alone courses, the technology component was integrated into a special education methods course. Other literature discusses integration of technology instruction in a variety of methods courses including literacy (Abbott & Faris, 2000) and mathematics and science (Thomas & Cooper, 2000). It would seem that different software tools may be more relevant to some

courses than to others. It may be that survey results would be different if the Introduction to Technology course were integrated into different methods courses.

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Appendix A

Student Survey

Teacher Name _____

Grade(s) _____

Personal Computer Type _____

Directions for use:

N = No knowledge in this area.

A = Awareness only of this area; need to learn how to utilize

L = Limited skills; desire for more

B = Basic knowledge; skills to use or useable knowledge of area but not proficient

C = Competent in area

I. Knowledge of operation of microcomputers and peripherals:

Skill	Rating				
	N	A	L	B	C
Operate a computer					
Operate a projection device LCD pad, projector, etc.)					
Hook up external devices					
Install and set up software					
Explain safety features about computers and peripherals					
Explain best operating conditions for computers					
Use simple techniques for trouble-shooting when software or hardware does not work.					
Perform routine maintenance of technology system					

Operate CD-ROMs	
Operate and maintain printers	
Operate and maintain scanners	
Operate and maintain digital cameras	

II. Use of computer operating systems:

Skill	Rating				
	N	A	L	B	C
Initialize disks					
Operate/navigate Macintosh system					
Operate/navigate Windows system					
Begin software program in Macintosh					
Begin software program in Windows					
Delete program in Macintosh					
Change settings in Macintosh					
Find file in Macintosh					
Make alias in Macintosh					
Configure peripherals in Macintosh					
Delete program in Windows					
Change settings in Windows					
Find file in Windows					
Make shortcut in Windows					
Configure peripherals in Windows					

III. Acquire knowledge of the use of computers and related technology:

Skill	Rating				
	N	A	L	B	C
Define terms and concepts related to technology applications					
Identify major issues associated with the use of technology					
Identify ways that computers can be infused into the curriculum.					
Take steps to keep knowledge and skills in technology up to date.					
Identify sources of information about technology					

IV. Evaluation of software:

Skill	Rating				
	N	A	L	B	C
Identify the purpose of the software program					
Determine the characteristics of learners appropriate for the program.					
Identify characteristics of software that meets instructional needs					
Evaluation of the content					
Match level of difficulty with learner					
Evaluate documentation					
Determine teacher options.					
Determine options for students with physical disabilities.					
Set up options for use (sound, scanning, etc.)					

VI. Use of technology to facilitate instruction:

Skill	Rating				
	N	A	L	B	C
Use technology for effective instructional practice					
Set up classroom for effective instructional practice, i.e. one on one use, large group use, effective placement, effective scheduling, etc.					
Use tutorial programs appropriately					
Use drill and practice programs suitably					
Use problem solving programs effectively					
Use tool software for students (word processing, spreadsheet, etc.)					
Use tool software for teachers (word processing, spreadsheet, gradebooks, etc.)					
Use assistive technology appropriately					
Evaluate the effectiveness of technology applications					
Use the Internet for research					
Use Internet online learning activities like Jason or Globalearn					
Have students use multimedia for creating projects (Hyperstudio, Linkway, Digital Chisel, etc.)					
Have students use Web pages to create projects					

VII. Use of technology as a teacher tool:

Skill	Rating				
	N	A	L	B	C
Use a word processor to develop materials					
Use spell checkers, thesaurus, wizards, mail merging and other utility programs					
Use a database for maintaining student rosters/records					
Use a spreadsheet for mathematical jobs such as grades					
Use email					
Use the Internet for lesson plans					
Use the Internet for researching information to aid teaching.					
Use listservs					
Use bulletin boards					
Use IEP generators					
Use word processor for IEPs, reports					
Use portfolio software					
Conduct regular back-ups of data					
Transfer files between different computers/programs					

VIII. Developing a technology plan:

Skill	Rating				
	N	A	L	B	C
Identify goals for using technology in education					
Identify parts of the curriculum that are appropriate for technology and how its use can be implemented.					
Plan appropriate classroom changes for accommodating technology					
Ensure equitable access to the computer					
Create guidelines for technology use					
Develop a budget for technology					
Determine possible funding sources for technology needs.					
Write grants for technology					

IX. Dissemination of technology information:

Skill	Rating				
	N	A	L	B	C
Maintain a file of information on technology					
Provide consultation to colleagues on technology					
Provide consultation to parents on technology					
Make presentations on technology					
Prepare written reports/articles on technology					

Appendix B

Integrated Syllabus for IC

Integrated Syllabi of Introduction to Special Education and Introduction to Technology in Education

SPE 500	TIE 500
Introduction to course	KP Studio Introductory activity
History of special education	Assignments with Living Books
Legal issues, IDEA, 504, ADA	Evaluating web sites, legal use of technology
Accessibility, advocacy, deaf-blind	Technology standards
Intelligence, learning, MR, gifted, TBI, autism	Finding lessons on the web
Accommodating diverse learners	Assistive technology
Supporting students' social/ emotional needs/EBD	Spreadsheets data analysis
Multiple disabilities, OHI	Multimedia
Community, family and collaboration, agencies, transition	Web pages and electronic portfolios

TIE 500 Syllabus for IC

TIE 500 Introduction to Technology in Education
Instructor: Dr. Cindy L. Anderson
Email: kcanders@voyager.net
Phone: 262-552-7178
Office Hours: Thursday, 3:30 to 4:40, Manitoba, online Monday 5:00 to 6:00, Wednesday 4:00 to 5:00

Program Mission: The mission of the Technology in Education program is to prepare educators to use technology in their schools and to provide instructional leadership and technical support to other educators who wish to integrate technology in teaching and learning.

Catalog Description: This survey course provides the educator with a broad base of knowledge about the use of computers in education. Students will have hands-on experience with word processing, databases, spreadsheets, graphics software, instructional software, and teacher utilities. Other topics include software evaluation, hardware selection, and telecommunications.

Required Textbook(s):

Morrison, G.R., Lowther, D.L., and DeMeulle, L. (1999). Integrating computer technology into the classroom. Upper Saddle River: NJ: Merrill

ISTE (2000). National educational technology standards for students: Connecting curriculum and technology. Eugene, OR: Author.

Materials:

Two 3 and 1/2 inch "floppy" disks; these will be used for your work. Format these for IBM.

Prerequisite: none.

Objectives or Competencies:

The student will be able to:

4. Operate a computer and common peripherals.
5. Create a document on a word processor and print it out.
6. Use a multimedia program in an effective instructional fashion, complete with appropriate images, audio and video.
7. Effectively evaluate software.
8. Select appropriate software for instructional activity after evaluating several packages.
9. Use teacher tools to create instructional materials.
10. Use a graphics program.
11. Create entries, search, sort, and print reports with a database.
12. Use a spreadsheet to analyze and chart data and maintain student records.
13. Use telecommunications effectively in instruction.
14. List technology resources that are helpful for educators.
15. Define technology terminology appropriately.

Content and Sequence:

Night 1 – Technology Activity: KidPix Studio Deluxe (Multimedia Software)
Assignment: Read Chapters 1 and 2

Night 2 – Technology Activity: Instructional Software, specifically Storybook CD-ROMs
Assignment: Read Chapter 3

September 23 – Technology Activity: Internet, email, Creating a CDA lesson
Assignment: Chapter 12

September 28 – Technology Activity: Using and evaluating the Internet
Assignment: Chapters 4 and 6

October 5 – Technology Activity: Addressing Technology Standards and assistive technology
Assignment: Chapters 5 and 7

October 12 – Technology Activity: Accessing technology-integrated lessons on the Web and writing yours with a word processor. Types of software available for integration.
Assignment: Work on Projects

October 19 - No Technology Activity
Assignment: Chapters 8, 9

October 26 – Technology Activity:: Spreadsheets and databases
Assignment: Chapters 13 and 15

November 2 – Technology Activity: Online data activities and teacher utilities
Assignment: Chapters 10, 11, 14.

November 9 – Technology Activity: Multimedia
Assignment: Compile portfolio elements to present

November 16 – Technology Activity: Presentations
Assignment: Final Test

Projects for Class:

1. Evaluate 3 software packages with appropriate modified use for 3 different disabilities in the classroom. Results will be entered into a classroom database of evaluations. Include a word processed document that explains how to use the software in an appropriate instructional fashion and inappropriate instructional fashion. Your intended audience is a substitute teacher for your classroom. Be sure to include directions on how to use the technology that the software requires in an equitable fashion and how to use it for diverse students. When the database is finished, each student will use it to sort and print out a report of two other packages that you think that you might use in your classroom.

100 points
Standards Covered: 4, 5, 6, 7, 9, 11, 15, 16, 17, 18, 19, 24

2. Create a family technology handbook with a multimedia package that describes the operation of the computer and includes a policy and directions for searching the Internet, with tips for evaluating its resources. The handbook must include an original graphic. It is suggested that this be a depiction of the computer with common peripherals that are labeled. If this is not the choice, another original graphic must be depicted and a different method for identifying and labeling the parts of a computer with its peripherals must be used.

100 points
Standards Covered: 1, 10, 15, 16, 18, 19, 20, 21

3. Develop a thematic lesson plan that includes technology, assing areas from the list of minimal student standards, i.e. inquiry lesson with spreadsheet data collection and interpretation of the data. Begin the lesson with a CDA entry which provides a type of outline. Include a list of resources appropriate for a technology-using teacher. Include a rubric for scoring the lesson and a spreadsheet template for recording the grade of the lesson.

100 points
Standards Covered: 2, 3, 12, 13, 14, 15, 16, 18, 19, 22, 23

Feel free to work together in groups to complete these assignments. I would like individual products that reflect your individual classes and personalities, especially for the portfolios, but brainstorming and working together is encouraged.

Grading:

Test 1	100 points
Test 2	100 points
Project 1	100 points
Project 2	100 points
Project 3	100 points

NLU seeks to ensure that its programs are accessible to all persons. Students in need of special assistance or accommodation regarding any of the course requirements as outlined in this syllabus, the course objectives and/or course evaluation and assessment criteria, are advised to notify me immediately. We can meet to discuss a solution privately.

Appendix C

TIE 500 Syllabus for SAC

TIE 500 Introduction to Technology in Education
Instructor: Dr. Cindy L. Anderson
Email: clanderson@rr.wi.com
Home Phone: 262-552-7178
Office Phone: 414-272-2658
Office Hours: Thursday, 2:30 to 4:40, Manitoba, Tuesday, 2:30 to 4:30
Program Mission: The mission of the Technology in Education program is to prepare educators to use technology in their schools and to provide instructional leadership and technical support to other educators who wish to integrate technology in teaching and learning.
Catalog Description: This survey course provides the educator with a broad base of knowledge about the use of computers in education. Students will have hands-on experience with word processing, databases, spreadsheets, graphics software, instructional software, and teacher utilities. Other topics include software evaluation, hardware selection, and telecommunications.
Required Textbook(s):
Morrison, G.R., Lowther, D.L., and DeMeulle, L. (2000). Integrating computer technology into the
classroom. Upper Saddle River: NJ: Merrill
Materials:
Two 3 and 1/2 inch "floppy" disks; these will be used for your work. Format these for IBM.
Prerequisite: none.
Objectives or Competencies:
The student will be able to:

16. Operate a computer and common peripherals.
17. Create a document on a word processor and print it out.
18. Use a multimedia program in an effective instructional fashion, complete with appropriate images, audio and video.
19. Effectively evaluate software.
20. Select appropriate software for instructional activity after evaluating several packages.
21. Use teacher tools to create instructional materials.
22. Use a graphics program.
23. Create entries, search, sort, and print reports with a database.
24. Use a spreadsheet to analyze and chart data and maintain student records.
25. Use telecommunications effectively in instruction.
26. List technology resources that are helpful for educators.
27. Define technology terminology appropriately.

Content and Sequence:

When Scheduled: MPS Training – Technology Training: Internet, email, Creating a CDA lesson

Night 1 – Discussion Topic - Integrating the computer into the classroom - theories that might impact its integration : behaviorism, constructivism, cooperative learning, multiple intelligences.
Technology Activity: Learn Windows interface; Microsoft Word if time; if not, paint program of Appleworks - With partners, create an alphabet KPS or Appleworks Slide Show.
Assignment: Read Chapter(s) 1, 2

Night 2 - Discussion Topic - NTeQ Model for instructional planning and best practices in technology integration in the classroom; academic standards
Technology Activity: Explore laptops and software that comes with laptop; writing activities with the computer (add email if possible); writing software (Imagination Express, Hollywood High, Appleworks, Microsoft Word, Storybook Weaver Deluxe, etc.).
Assignment: Read Chapter(s) 3, 4, 5

Night 3 - Discussion Topic - Designing the lesson to include the various types of software, teacher facilitation, finding technology integrated lessons on the Web
Technology Activity - Inspiration; Using the Internet for research, Integrating the Internet in the classroom; WebCT design and posting
Assignment: Chapter(s) 6, 7

Night 4 – Discussion Topic - Managing the computer and using the tools of Web
Technology Activity: Building Web pages, build own Web page for PT3
Assignment: Chapter(s) 8, 9

Night 5 – Discussion Topic - Assistive Technology
Technology Activity: Multimedia (It addresses learning styles and writing also.)
Assignment: Chapter(s) 10
Night 6– Discussion Topic - Using spreadsheets
Technology Activity: The Graph Club and Appleworks Spreadsheet
Assignment: Chapter(s) 11

Night 7 - Discussion Topic - Using databases
Technology Activity - Appleworks database
Assignment: Chapter(s) 12, 13

Night 8 – Discussion Topic - Multimedia in the classroom
Technology Activity - Hyperstudio
Assignment: Chapter(s) 14

Night 9 – Discussion Topic - Integrating technology in the classroom
Technology Activity - Online activities and subject software
Assignment: Chapter(s) 15

Night 10 – Discussion - Thematic Units
Technology Activity - Portfolio
Assignment: Compile portfolio elements

Projects for Class:

1. Evaluate 5 software packages with appropriate modified use for 3 different disabilities in the classroom. Results will be entered into a classroom database of evaluations. Include a word processed document that explains how to use the software in an appropriate instructional fashion and inappropriate instructional fashion. Your intended audience is a substitute teacher for your classroom. Be sure to include directions on how to use the technology that the software requires in an equitable fashion and how to use it for diverse students. When the database is finished, each student will use it to sort and print out a report of two other packages that you think that you might use in your classroom.

   100 points
   Standards Covered: 4, 5, 6, 7, 9, 11, 15, 16, 17, 18, 19, 24

4. Create a Web page that will become the beginning of your portfolio. This Web page introduces you and describes your teaching interests. It links your artifacts acccording to the elementary education standards. Most artifacts will be projects from your classes that you will type on your laptop. These can be saved and become part of your portfolio. With this portfolio, you will need to take a digital picture of yourself to put in it. You will need to scan in documents that do not have a computer file for them. A printed version of portfolio will be turned into the instructor.

   100 points
   Standards Covered: 1, 10, 15, 16, 18, 19, 20, 21

5. Develop a thematic lesson plan that includes technology, addressing areas from the list of minimal student standards, i.e. inquiry lesson with spreadsheet data collection and interpretation of the data. Include a list of resources appropriate for a technology-using teacher. Include a rubric for scoring the lesson and a spreadsheet template for recording the grade of the lesson.

   100 points
   Standards Covered: 2, 3, 12, 13, 14, 15, 16, 18, 19, 22, 23

Feel free to work together in groups to complete these assignments. I would like individual products that reflect your individual classes and personalities, especially for the portfolios, but brainstorming and working together is encouraged.

Grading:

WebCT postings	100 points
Project 1	100 points

Project 2	100 points
Project 3	100 points

NLU seeks to ensure that its programs are accessible to all persons. Students in need of special assistance or accommodation regarding any of the course requirements as outlined in this syllabus, the course objectives and/or course evaluation and assessment criteria, are advised to notify me immediately. We can meet to discuss a solution privately.

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